

Growth and Characterization of Nanostructured Carbon Film Field Emitters

Jose Perez, University of North Texas, DMR-0074636

Our aim is to study the field emission (FE) properties of nanostructured carbon films such as carbon nanotubes. We observed that Cs deposition significantly enhances the FE properties of single-wall carbon nanotubes (SWNTs). This effect can be used to significantly increase the FE current in devices such as flat panel displays and portable x-ray systems. We found that residual O₂ gas exposure degrades SWNTs less than multi-wall nanotubes and diamond films. Other results concerned the effects of atomic hydrogen on diamond and microwave absorption by SWNTs: *Phys. Rev. Lett.* **86**, 3368 (2001). *Appl. Phys. Lett.* **81**, 4538 (2002). *Appl. Phys. Lett.* **83**, 2683 (2003). Review article in *Encyclopedia of Nanoscience and Nanotechnology* (2004).

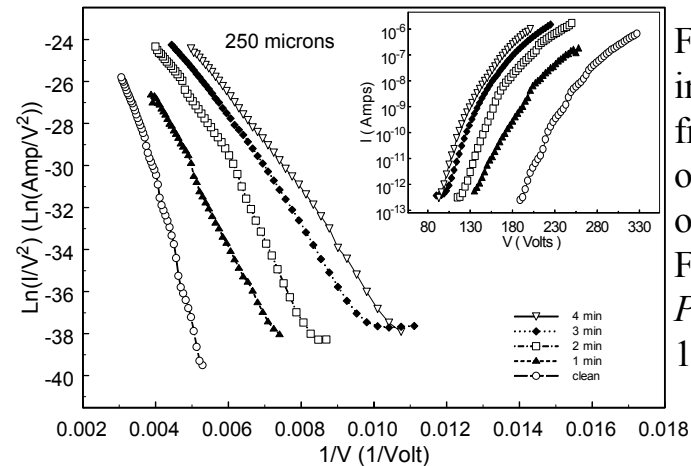


Fig. 1. Cs increases FE from SWNTs by over six orders of magnitude. From *Appl. Phys. Lett.* **78**, 108 (2001).

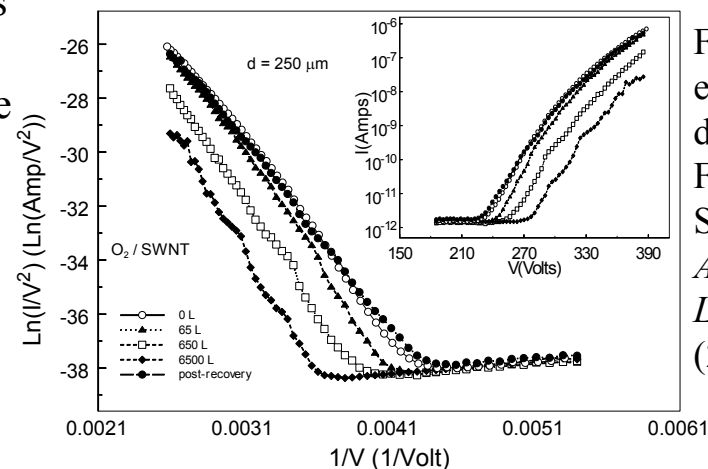


Fig. 2. O₂ exposure degrades least FE from SWNTs. From *Appl. Phys. Lett.* **79**, 1867 (2001).

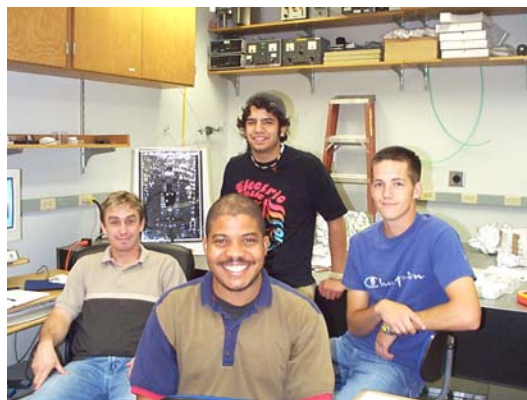
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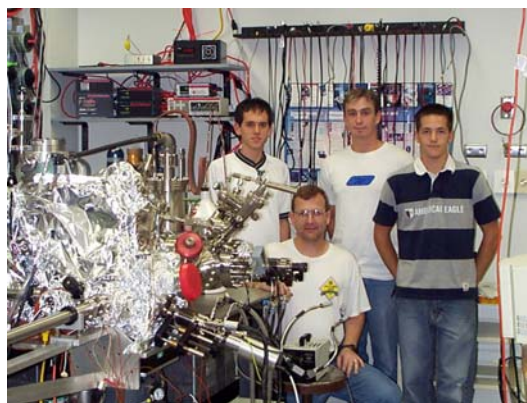
Education:

Four undergraduates (Gary Woodard, Scott Williams, John McCarry and Rudy Potter), three graduate students (Atul Wadhawan, Joffrey Leevy and Roberto Failla), and two postdocs (Richard Stallcup and Kenny Stephens) contributed to this work. The undergraduate and graduate students are currently employed in scientific positions or attending graduate school. Richard Stallcup is currently a Research Scientist at Zyvex, Inc. in Richardson, TX and Kenny Stephens is an assistant professor at Hardin-Simmons University in Abilene, TX.

Outreach:



From Left: Jason Rejman, grad student, Tommy Blair, undergrad student, Joe Garza, Upward Bound high school student, and Ross Giblet, NSF REU student.



Front: Sean Eyre, K-12 high school teacher, Ross Giblet, NSF REU student.
Back: Ryan Cottier and Jason Rejman, grad students.